Butler University Botanical Studies

Volume 2 *Butler University Botanical Studies* Article 8

General Distribution of the Species Aster Found in Indiana

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GENERAL DISTRIBUTION OF THE SPECIES OF ASTER FOUND IN INDIANA

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This paper does not attempt to deal in a taxonomic way with the problem of species differentiation in the asters, but involves a study of the general distribution of certain species of that genus.

In finding the distribution of each of the Indiana species of Aster throughout the United States, adjacent provinces of Canada and Mexico, the question arose as to the relation of the distribution in the state of Indiana to their general distribution in North America; that is, if the species is northern in Indiana, is the distribution northern in North America; if southern in Indiana, is it southern in general, etc.? None of the asters found in Indiana extend west of the Rocky mountains in their general distribution. From the standpoint of distribution, the species of Aster found in Indiana may be divided into four groups, *viz.*, those that are decidedly northern in both state and general distribution, those that are eastern (including northeastern and southeastern), tbose that are southern and southwestern, and those found throughout the state and eastern United States. However, these groups are subject to revision. As furtber collecting is done, new stations for these species will be found, because as yet no one has conducted a systematic hunt for the asters over the state.

The nomenclature used is that of the seventh edition of Gray's Manual. The general distribution for North America was gained by ranges given by Gray's Manual, Britton and Brown's Illustrated Flora and Small's Flora of Southeastern United States, together with published reports of local floras and the distribution notes available. The distribution for the Indiana species by counties was gained through published reports and a list of asters collected by Charles C. Deam, of Bluffton, specimens of which are to be found in the Deam herbarium. Only species have been considered. The varieties and forms were not regarded as being of enough importance for this study because of the lack of available information concerning their local distribution.

The species reported in Indiana were not checked for taxonomic correctness, but the determination of each species by the author reporting it has been accepted for the present study. The species reported

and the distribution groups into which they have been placed are as follows:

GROUP A (FIG. 1). *Species having a northern distribution both in the state and in the country at large.*

Aster angustus (32, 22, 49).
A. junceus (32, 34, 28, 17, 22, 6, 26, 25, 33, 18).
A. longifolius (12, 28, 2, 46, 22, 6, 49).
A. Lowrieanus (1, 22, 6, 45, 19, 42, 48).
A. macrophyllus (34, 32, 28, 17, 12, 8, 22, 6, 45, 25, 49, 3, 48, 42).
A. miser (2, 44, 18).
A. polyphyllus (12, 11, 22, 6, 45, 20, 42).
A. ptarmicoides (11, 12, 2, 32, 22, 6, 45, 27, 49, 42).

GROUP B (FIG. 2). *Species having a wide distribution throughout the state and country at large.*

Aster azureus (32, 28, 17, 12, 2, 23, 4, 44, 40, 1, 22, 49).
A. dumosus (32, 28, 12, 4, 40, 51, 5, 1, 2, 44, 9, 22, 6, 45, 10, 52, 33, 42).
A. ericoides (2, 9, 53, 34, 32, 16, 12, 8, 50, 17, 4, 40, 5, 1, 22, 6, 45, 41, 33, 42, 48, 47).
A. laevis (12, 32, 17, 37, 4, 1, 11, 2, 22, 6, 45, 26, 48, 47, 49, 3, 42).
A. lateriflorus (32, 28, 12, 4, 40, 22, 6, 45, 46, 25, 52, 49, 3, 42, 48).
A. multiflorus (32, 12, 2, 16, 4, 1, 9, 22, 6, 45, 47, 33, 49, 42).
A. Novæ-Angliæ (38, 14, 8, 5, 15, 30, 36, 1, 44, 34, 32, 28, 12, 17, 8, 50, 2, 16, 4, 22, 6, 45, 49, 18, 42, 48, 31, 21).
A. paniculatus (32, 28, 12, 16, 4, 33, 22, 6, 45, 25, 49, 48, 27, 18, 42, 47).
A. patens (12, 17, 4, 44, 2, 22, 6, 45, 41, 33, 42, 48).
A. puniceus (2, 38, 32, 28, 17, 12, 16, 4, 9, 44).
A. salicifolius (32, 28, 4, 12, 16, 22, 6, 45, 26, 49, 42).
A. Tradescanti (32, 28, 38, 12, 4, 16, 40, 5, 1, 2, 22, 6, 45, 33, 42).
A. undulatus (12, 4, 2, 5, 9, 53, 44, 22, 6, 45, 25, 33, 42, 48).
A. vimineus (32, 28, 17, 12, 21, 6, 45, 52, 33, 49, 20, 42, 48).

GROUP C (FIG. 3). *Species having a northeastern, eastern and southeastern distribution at large.*

Aster amethystinus (32, 12, 6, 22, 49).
A. concinnus (28, 6, 22, 45, 43, 18, 48).
A. cordifolius (32, 28, 2, 38, 17, 12, 16, 4, 40, 5, 1, 15, 9, 53, 51).

A. divaricatus (32, 12, 1, 6, 22, 45, 21, 33, 49, 42, 48).
A. Novi-Belgii (32, 28, 12, 45, 22, 6, 18, 35, 24).
A. prenanthoides (2, 38, 12, 46, 9, 6, 22, 45, 42, 48).
A. sagittifolius (32, 28, 12, 16, 4, 2, 1, 44, 9, 6, 22, 45, 31, 49, 3, 24).
A. Shortii (8, 2, 12, 5, 16, 40, 1, 9, 53, 6, 22, 45, 33, 49).

GROUP D (FIG. 4). *Species having a varied distribution in the state but found generally in the southwest of the United States.*
Aster Drummondii (34, 32, 14, 16, 4, 12, 22, 6, 45, 49, 42).
A. furcatus (32, 28, 23, 14, 13, 22, 6).
A. linariifolius (23, 32, 16, 22, 10, 47, 33, 48).
A. oblongifolius (12, 44, 2, 30, 22, 6, 45, 42).
A. sericeus (32, 29, 22, 6, 45, 49).
A. tenuifolius (44, 2, 53, 9, 22, 6, 45).
A. turbinellus (1, 22, 6, 45).
A. umbellatus (11, 32, 28, 16, 7, 23, 50, 22, 10, 3, 25, 35, 48).

The known distribution of these species in Indiana is shown on the state maps. Published reports are shown by "●," and species in Deam's herbarium but not previously published are shown by "X." In order to show graphically the relation of state and regional distribution, the groups of species were plotted on the maps shown in Figures 1-4, eight species being shown on each map. The general distribution was outlined and then filled in by a series of parallel lines of a given angle, each species having a different but definite angle. Figure 1 shows the species of Group A, *i e.*, those with a northern distribution. The region in which all eight species occur is so limited that only one rosette is formed. The rosette is formed by all eight radii converging at one point, this being the region of common distribution for all eight species. The map shows that these species are not only northern in Indiana, but they are also northern in their general distribution in the United States. Four of the eight reach somewhat farther south in other states than in Indiana, but their distribution is characteristically northern.

Figure 2 illustrates the range of the species (Group B) which show a general distribution within the state. It will be noted from the map that the distribution is also over a wide area outside Indiana. None of the species occur west of the Rockies, but all extend well into the prairies, and all reach into New England and south along the Appalachians. They are, therefore, general in distribution for the eastern half of the United States.

In Figure 3, the eight species (Group C) are northeastern in general distribution, with extensions to the east and southeast. However, these species have a smaller range than those in Figure 1. The Indiana distribution of these eight species varies more than in any other group. Three species, *A. sagittifolius, A. Shortii* and *A. cordifolius,* may be said to be generally distributed within the state; *A. prenanthoides* is eastern and central within the state; and four species, *A. divaricatus, A. concinnus, A. amethystinus* and *A. Novi-Belgii* are northern within the state.

In Figure 4 is shown the range of Group D, *i. e.*, those with a characteristic southern and southwestern distribution. Seven of these species are found extending into Texas, with two of them extending into New England. *A. tenuifolius* is found in the salt marshes along the Atlantic coast from Massachusetts to Florida. It has been reported in southern Indiana by four different collectors. This is the only species of this group reaching the limit of its range within the state. All other species of the group, even though characteristically southwestern, extend to the northern or northwestern limits of the state.

From this study it appears that the species of Aster occurring in Indiana have come from four different sources. Approximately 21 per cent. of them have their main distribution northward, centering around the Great Lakes region. Approximately 37 per cent. occnr throughout eastern United States and Canada, with Indiana being near the geographical center of their range. Approximately 21 per cent. have their general range closely centering about an area including the Great Lakes and an eastern and southeastern extension along the Appalachians. Approximately 21 per cent. have their main distribution extending chiefly southwestward, reaching into Texas. The state thus seems to be a meeting ground for northern, eastern and southeastern species, in addition to being well represented by widespread species.

The writer wishes to express her gratitude to Dr. Friesner for suggesting the study and the help received from him; to Mr. C. C. Deam for sending his county records of Asters of Indiana, and to Mr. A. J. Lindsey for his helpful suggestions.

FIGURE 1. SPECIES WITH NORTHERN DISTRIBUTION

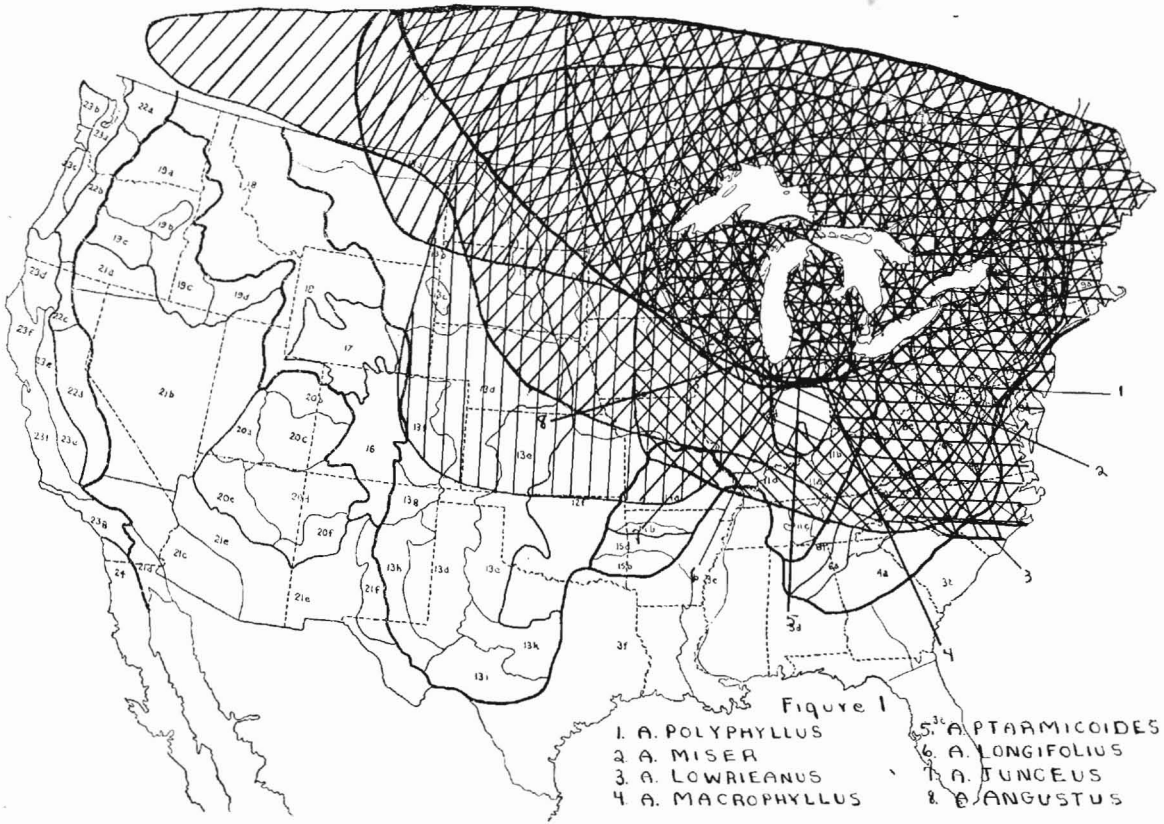


FIGURE 2. SPECIES WITH WIDE DISTRIBUTION

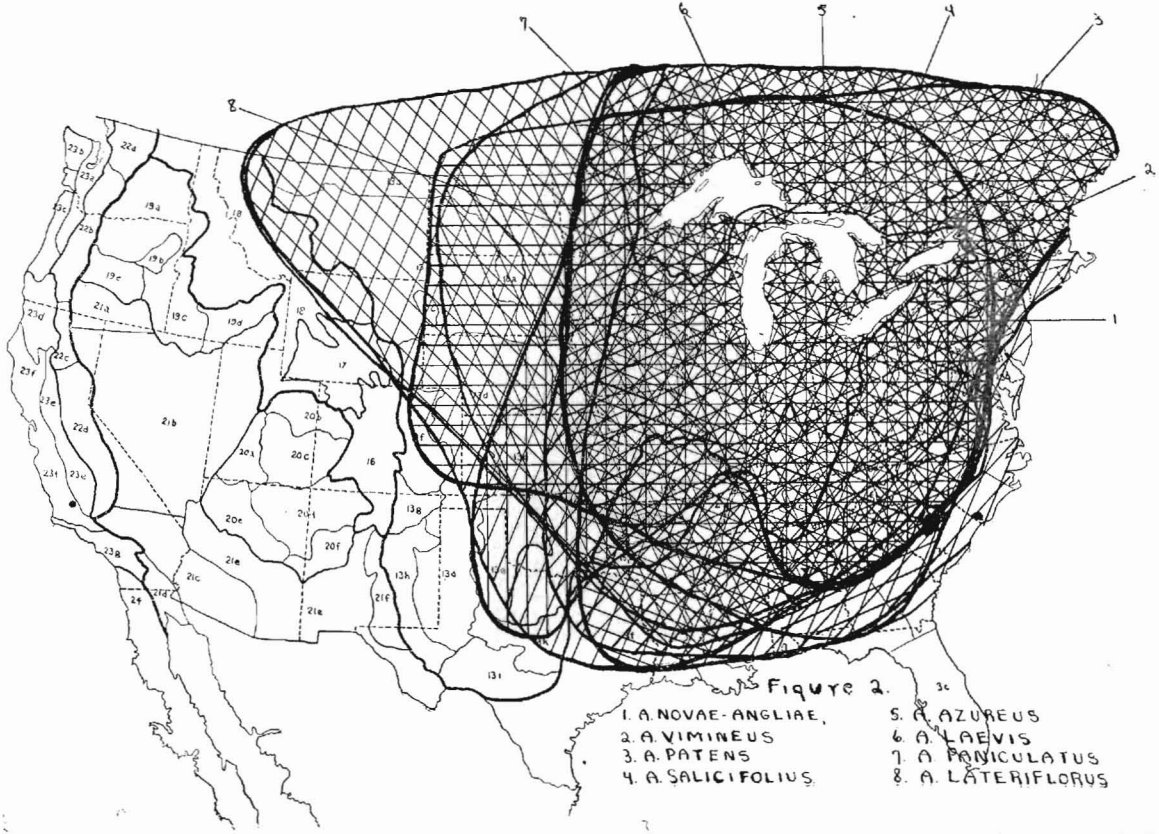


FIGURE 3. SPECIES WITH NORTHEASTERN, EASTERN AND SOUTHEASTERN DISTRIBUTION

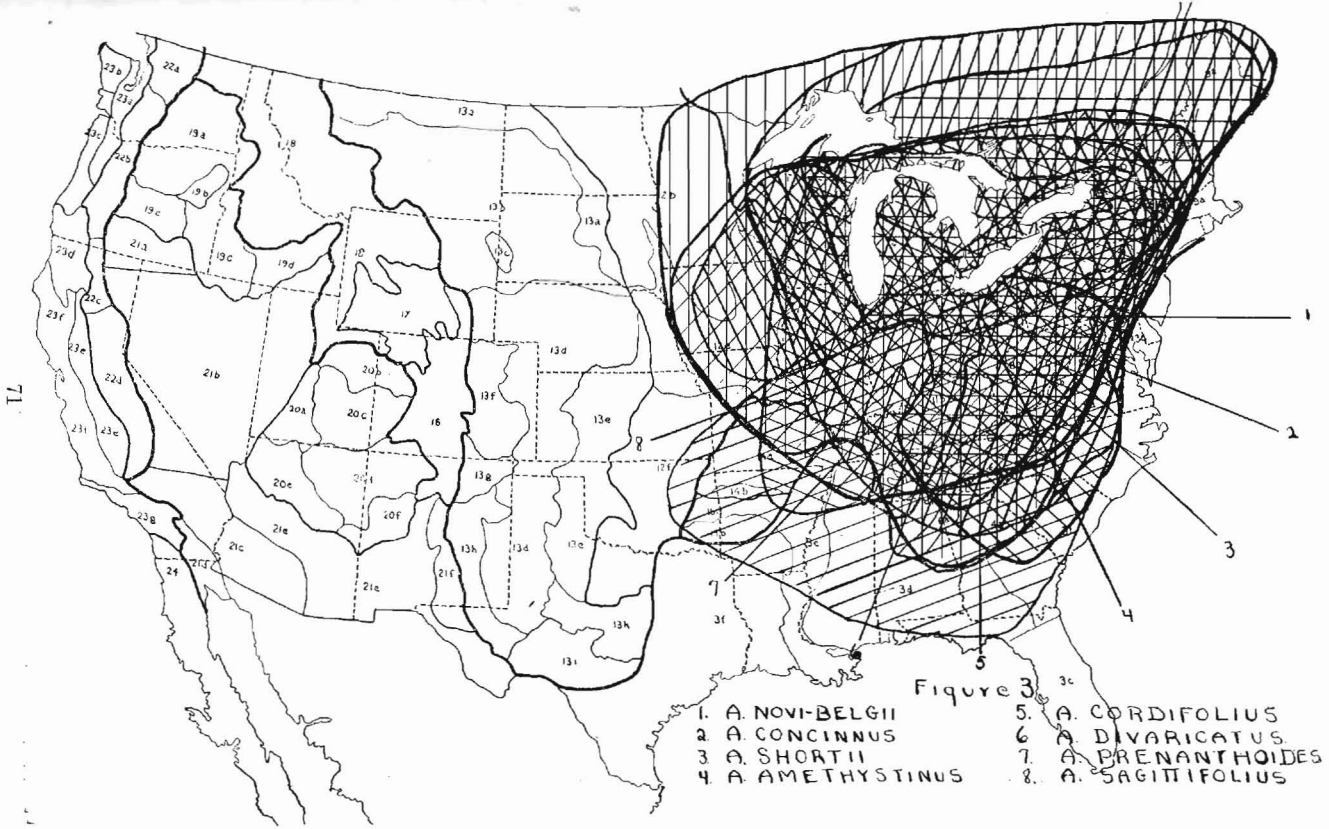
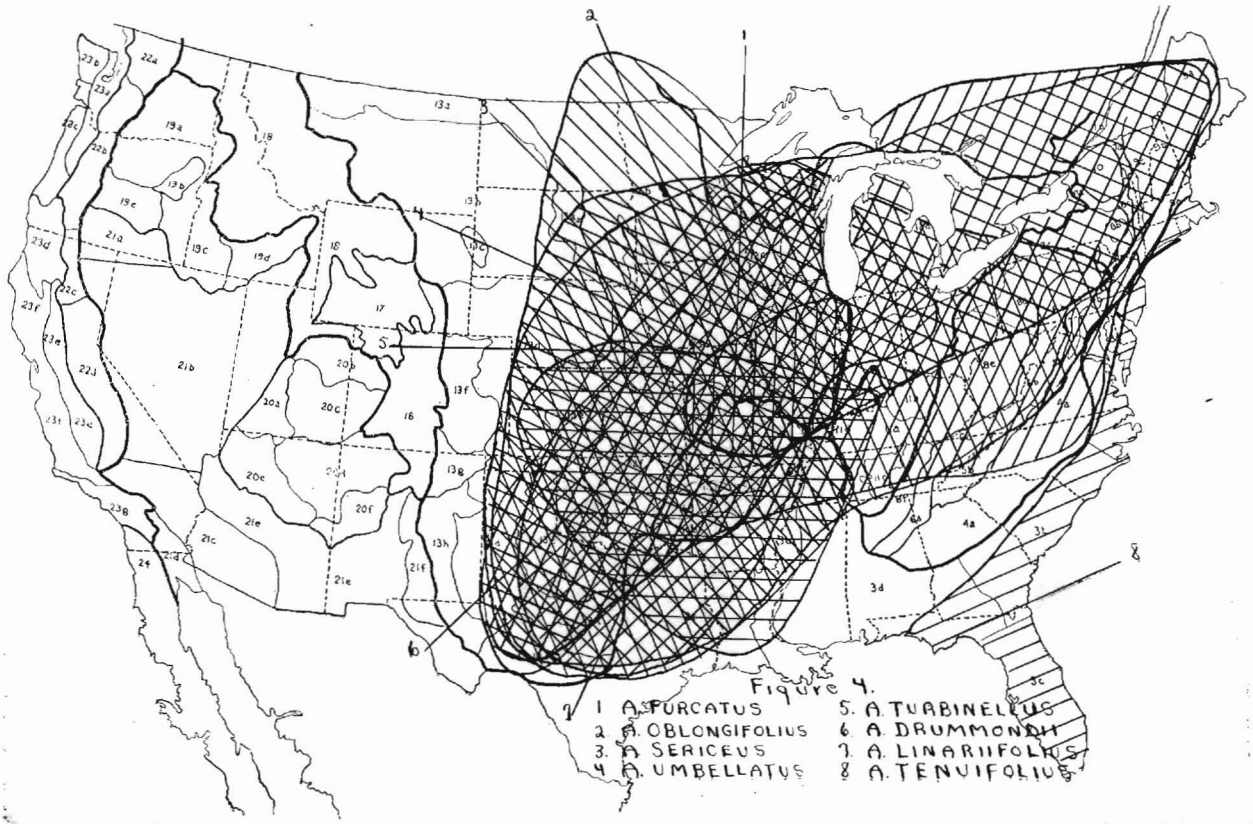
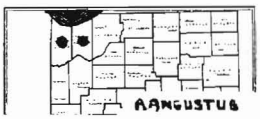


FIGURE 4. SPECIES WITH SOUTHEASTERN DISTRIBUTION

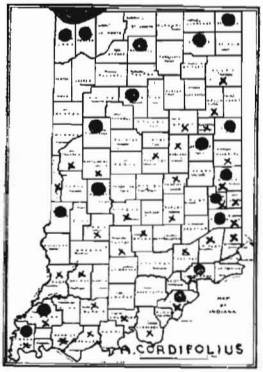



A.AMBLYSTIRUS


A.ANGUSTUS

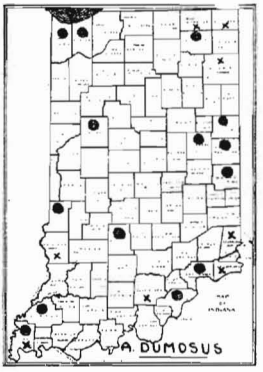

A.AZUREUS


A.CONCINNUS


A.CORDIFOLIUS


A.DIVARICATUS


A.DRUMMONDII

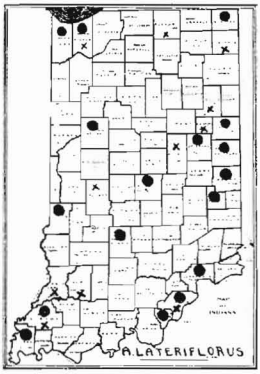

A.DUMOSUS


A.ERICOIDES


A.FURCATUS


A.JUNCEUS


A. LAEVIS


A. LATERIFLORUS


A. LINARIIFOLIUS


A. LONGIFOLIUS


A. LOWRIEANUS


A. MACROPHYLLUS


A. MISER


A. MULTIFLORUS


A. NOVAE-ANGLIAE

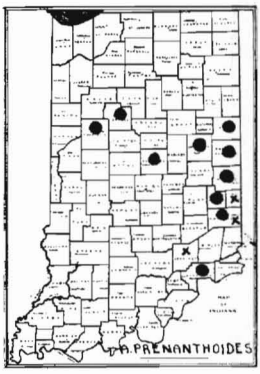

A. NOVI-BELGII


A. OBLONGIFOLIUS


A. PANICULATUS


A. PATENS


A. POLYPHYLLUS


A. PRENANTHOIDES


A. PTARMICOIDES


A. PUNICEUS

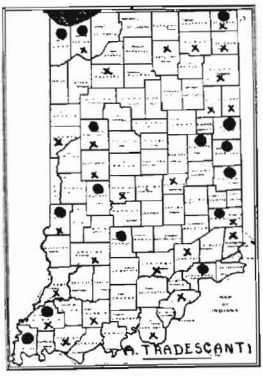

A. SAGITTIFOLIUS


A. SALICIFOLIUS


A. SERICEUS


A. SHORTII

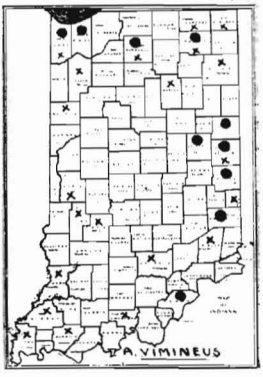

A. TENUIFOLIUS


A. TRADESCANTI


A. TURBINELLUS


A. UMBELLATUS


A. UNDULATUS


A. VIMINEUS

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